

Safety Brief

ISO 26262



Infineon Magnetic Position Sensors in Functional Safety Applications

ISO 26262 defines the development of electric and electronic automotive systems regarding their functional safety. The aim of this standard is to reduce failures and malfunction of such systems. Development process depends on the ASIL (Automotive Safety Integrity Level) of the target application and can range from ASIL-A to ASIL-D. Applications like steering or braking systems for example, are rated with the highest level ASIL-D. There, a failure can lead to an uncontrollable vehicle and may cause fatal injuries.

All new Infineon Safety Sensors are developed in compliance with ISO 26262 standard, thus allowing direct use in all safety applications. Sensors which are developed as a QM part can nevertheless be used in ISO compliant systems as described in part 8 clause 13 of the standard. Infineon provides the necessary support for qualification of existing QM products, as ISO 26262 ready and ISO 26262-compliant products.

Typical Applications Requiring Functional Safety

- Steering systems: torque and angle sensing, Index counting, EPS-motor rotor position sensors
- Braking system: brake by wire, brake booster (actuator), brake pedal switch (brake light)
- Clutch and transmission systems (actuators)
- E-gas (gas pedal and throttle)

Safety Key Features

Sensor Chip

- Dedicated safety mechanisms
- Built in self-test at start up
- Cyclic checks of main blocks during operation

Sensor Package

- Dual-sensor package offers redundancy and diversity

Interfaces

- Chip status communication to ECU
- Multiple digital and analog interfaces available

Proven in Field

- Mature GMR technology (manufacturing > 10 years)
- Mature Hall technology (manufacturing > 20 years)
- Zero defect quality

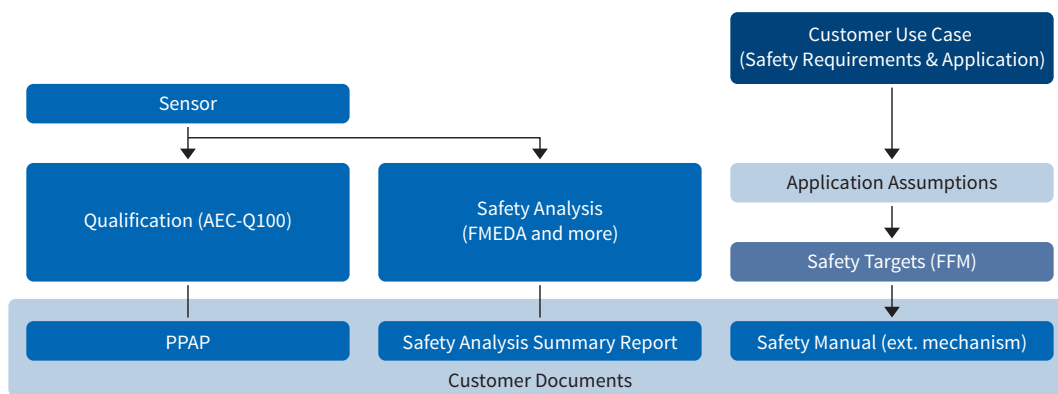
ISO 26262

Infinion Magnetic Position Sensors in Functional Safety Applications

For ISO 26262 ready sensors extensive functional safety analysis have been conducted for various application use cases by means of FMEDA (Failure Mode Effects and Diagnostic Analysis), DFA (Dependent Failure Analysis) and FTA (Fault Tree Analysis). Resulting FIT rates and safety-related judgments derived from these analyses are summarized in Safety Analysis Summary Reports (SASR). These reports are provided to customers to serve as building block for their system level safety concept. The preferred implementation of the ISO 26262 ready sensors is described in dedicated Safety Manuals.

New Infineon safety sensor development follows the full ISO 26262 compliant process: AV-model based requirement capturing and verification process ensures the fulfillment of ASIL-rated safety requirements. Dedicated safety analysis are done during development to ensure the achievement of the required safety targets. Infineon’s activities result in a simplified integration in safety-related applications.

Moreover Infineon offers expert support for system integrators to achieve the required ASIL on system level.



ISO 26262 Product Summary

| Product | Classification | Safety Manual | Safety Analysis Summary Report (SASR) | FIT Rate Base |
|------------|----------------------------|------------------|---------------------------------------|--------------------|
| TLE4997(D) | ISO 26262 ready | ✓ | ✓ | SN29500, IEC 62380 |
| TLE4998(D) | ISO 26262 ready | ✓ | ✓ | SN29500, IEC 62380 |
| TLE4999 | Development acc. ISO 26262 | Planned with SOP | Planned with SOP | IEC 62380 |
| TLE5009 | ISO 26262 ready | ✓ | ✓ | SN29500, IEC 62380 |
| TLE5009D | ISO 26262 ready | ✓ | ✓ | SN29500, IEC 62380 |
| TLE5309D | ISO 26262 ready | ✓ | ✓ | SN29500, IEC 62380 |
| TLE5012B | ISO 26262 ready | ✓ | ✓ | SN29500, IEC 62380 |
| TLE5012BD | ISO 26262 ready | ✓ | ✓ | SN29500, IEC 62380 |
| TLE5014 | Development acc. ISO 26262 | Planned with SOP | Planned with SOP | SN29500, IEC 62380 |

Published by
Infineon Technologies AG
85579 Neubiberg, Germany

© 2015 Infineon Technologies AG.
All Rights Reserved.

Visit us:
www.infineon.com

Please note!

THIS DOCUMENT IS FOR INFORMATION PURPOSES ONLY AND ANY INFORMATION GIVEN HEREIN SHALL IN NO EVENT BE REGARDED AS A WARRANTY, GUARANTEE OR DESCRIPTION OF ANY FUNCTIONALITY, CONDITIONS AND/OR QUALITY OF OUR PRODUCTS OR ANY SUITABILITY FOR A PARTICULAR PURPOSE. WITH REGARD TO THE TECHNICAL SPECIFICATIONS OF OUR PRODUCTS, WE KINDLY ASK YOU TO REFER TO THE RELEVANT PRODUCT DATA SHEETS PROVIDED BY US. OUR CUSTOMERS AND THEIR TECHNICAL DEPARTMENTS ARE REQUIRED TO EVALUATE THE SUITABILITY OF OUR PRODUCTS FOR THE INTENDED APPLICATION.

WE RESERVE THE RIGHT TO CHANGE THIS DOCUMENT AND/OR THE INFORMATION GIVEN HEREIN AT ANY TIME.

Additional information

For further information on technologies, our products, the application of our products, delivery terms and conditions and/or prices please contact your nearest Infineon Technologies office (www.infineon.com).

Warnings

Due to technical requirements, our products may contain dangerous substances. For information on the types in question please contact your nearest Infineon Technologies office.

Except as otherwise explicitly approved by us in a written document signed by authorized representatives of Infineon Technologies, our products may not be used in any life endangering applications, including but not limited to medical, nuclear, military, life critical or any other applications where a failure of the product or any consequences of the use thereof can result in personal injury.